

MASPS for ADS-B

Rev. A

Tracking Information (committee secretary only)	
Change Issue Number	3X
Submission Date	30 March 2001
Status (open/closed/deferred)	
Last Action Date	30 March 2001

Short Title for Change Issue:	Should air-referenced velocity be required in SV reports?
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MASPS Document Reference:		Originator Information:	
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Table/Figure number(s)	Table 3-5	Other	Fax: +1 (503) 391-3882

Proposed Rationale for Consideration (originator should check all that apply):	
	Item needed to support of near-term MASPS/MOPS development
X	DO-260/ED-102 1090 MHz Link MOPS Rev A
	ASA MASPS
	TIS-B MASPS
	UAT MOPS
	Item needed to support applications that have well defined concept of operation
	Has complete application description
	Has initial validation via operational test/evaluation
	Has supporting analysis, if candidate stressing application
	Item needed for harmonization with international requirements
	Item identified during recent ADS-B development activities and operational evaluations
X	MASPS clarifications and correction item
X	Validation/modification of questioned MASPS requirement item
	Military use provision item
	New requirement item (must be associated with traffic surveillance to support ASAS)

Nature of Issue:		Editorial	x	Clarity		Performance	x	Functional
<p>Issue Description (attach additional sheets if necessary): This is in support of AI-2-5: “Produce an Issue Paper proposing specific clarifications on the material in Section 3.4.3.1 regarding the Air Reference State Vector and required information in the SV.”</p> <p>The current (DO-242) MASPS includes air speed (SV element #13), but not heading, in Table 3-5 as required SV elements. Dan Castleberry indicated at our last meeting, however, that heading was <u>intended</u> to be part of the SV report (see minute #7 in the minutes for Meeting #2, in Washington). So it would seem that Air Speed and Heading should go together. Either they should both be included in the SV reports about airborne participants, or they should both be elements in another report with a lower update rate (e.g., MS report), or they should both be optional elements in the SV or another report.</p>								

Originator's proposed resolution if any (attach additional sheets if necessary):

It seems that the advocates of all three data links consider air speed and heading to be report elements that need not be included in messages from all airborne participants:

- (a) On 1090 MHz, the current MOPS, DO-260, does not require airspeed and heading to be transmitted from airborne participants that are transmitting ground-referenced velocity.
- (b) Steve Heppe, an advocate of VDL M4 data link, has argued in IP #28 that air speed and heading not be required of all ADS-B participants.
- (c) Chris Moody, a designer of the UAT data link, has argued in IP #9 that air speed and heading should not be required of all ADS-B participants.

I agree. Let's omit airspeed and heading as required SV elements from all airborne participants. Instead, let's require air speed and heading to be transmitted only from those airborne participants that declare (in the MS report) that they are providing that information. Moreover, let's not require air speed and heading to be transmitted at the same data rate as position and velocity.

See sections 3.4.3.1 and 3.4.3.2 of working paper 242A-WP-4-02 for my proposed text.

Note: Attach additional sheets to capture supporting discussion with source and date.

Chris Moody has argued in IP #9 that magnetic heading and airspeed should both be omitted from the SV report. The present 1090 MHz MOPS (DO-260) does not require them to be transmitted at all from an airborne participant that is transmitting ground-referenced velocity. (That seems to conflict with the current working of DO-242, since air speed, at least, is listed as SV element #13 in DO-242 Table 3-5.)

Richard Barhydt has argued in IP #27 that including air speed and heading in the SV report "would greatly improve the effectiveness and efficiency of a variety of current and future applications." In that paper, he lists the following applications: (a) paired approaches, (b) precision FMS procedures, and (c) trajectory prediction following a turn.

Steve Heppe has argued in IP #28 that air-referenced parameters (air speed and heading) should be excluded from the list of SV elements required to be transmitted by all airborne participants. In that paper, he considered four applications for air speed and heading, and concluded that none of these applications justified bundling air speed and heading with the basic SV transmissions. These applications were: (a) track extension, (b) meteorological data gathering, (c) enhanced speed control and flow control on an approach, and (d) determining aircraft orientation and likely direction of motion when aircraft is stopped. Since the latter application is not for airborne participants, I'll consider it in a different Issue Paper. Of the first three of Steve's applications, the one with the most justification for requiring in all SV reports seems to be "track extension." However, Steve points out that "most GA aircraft cannot provide heading information so even short-term extension becomes impossible for these aircraft. Any future ATM system must contend with a large number of users who cannot provide heading information – and if the future system can contend with these users, it can apply the same technique to high-end aircraft as well."